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EXAMINER	
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ART UNIT	PAPER NUMBER
2617	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/616,292	HOTTINEN, ARI	
	Examiner	Art Unit	
	Meless N. Zewdu	2617	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-59 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-17,19-51 and 53-59 is/are rejected.

7)☒ Claim(s) 18 and 52 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 10 July 2003 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 7/10/03.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This action is the first on the merit of the instant application.

2. Claims 1-56 are pending in this action.

Claim Objections

Claim 18 is objected to because of the following informalities: the claim recites "—transmitted from different antenna elements ---", where it should have been said " --- transmitted from **the different antenna elements** ---". Appropriate correction is required.

Claim 52 is objected to because of the following informalities: the claim recites "—transmit the identifier signals from different antenna elements ---", where it should have been said " --- transmit the identifier signals from **the different antenna elements** ---". Appropriate correction is required.

Claim Rejections - 35 USC § 103

Claims 1-3,5-15, 17, 19, 23-25, 29-32, 34-45, 49, 51, 53 and 57-59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wax et al. (Wax) (US 6,249,680 B1) in views of Kong (US 6,275,186 B1) and Grubeck et al. (Grubeck) (US 6,009,334)..

As per claim 1: Wax discloses a method for performing positioning in a radio system (see abstract), the method comprising:

transmitting a signal (see col. 4, lines 21-49, particularly, lines 35-49; col. 6, lines 4-8) through at least two different channels/paths (see col. 4, lines 33-35),

receiving said at least two signals (see col. 4, lines 24-33),

estimating by means of the received signals a spatial signature of the channels, and

defining by means of the spatial signature of the signals information related to the location of a receiver or transmitter (see col. 4, lines 21-56). But, Wax does not explicitly teach about transmitting an identifier signal (by the BS) and receiving at least two identifier signals (by the MS), as claimed by applicant. However, in a related field of endeavor, Kong teaches about a device and method for locating a mobile station , wherein a plurality of base stations transmit pilot/identifier signals which are received by a MS (see col. 3, lines 12-20; col. 4, lines 15-67; col. 5, lines 1-46). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the teaching of Wax with that of Kong for the advantage of using the optimal un-coded forward pilot data to locate a MS (see col. 3, lines 1-11). But, Wax in view of Kong doe not explicitly teach about channel estimation, estimating by means of the received identifier signals a spatial signature of the channels, as claimed by applicant. Note: a polarized signal requires at least two channels/frequencies. However, in a related field of endeavor, Grubeck teaches about determining position of a mobile terminal wherein a spatial signature of a transmitted signals/channels is **estimated** from direction of arrival (DOA) measurements of the received signals (see col. 6, lines 7-30).

Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the teaching of Wax in view of Kong with that of Grubeck for the advantage of more accurately determine distance and/or the position of a mobile radio terminal (see col. 1, lines 8-11; col. 1, lines 48-63).

As per claim 2: Wax teaches a method, defining as the information related to the location at least one direction between the receiver and transmitter by means of the spatial signature of the signals (see col. 4, lines 21-49).

As per claim 3: Wax teaches a method, defining the information related to the location by comparing an estimated spatial signature with previously known spatial signatures and defining as the location a position whose previously known spatial signature is closest to the estimated spatial signature (see col. 4, lines 50-65).

As per claim 5: Wax teaches a method, defining the information related to the location according to the map coordinate system when the location of at least the transmitter or receiver is specified in a map coordinate system (see col. 12, lines 15-31).

As per claim 6: Grubeck teaches a method, forming the spatial signature by utilizing several channel estimate matrices generated at different time instants (see abstract).

As per claim 7: Wax teaches a method, forming the spatial signature by utilizing several channel estimate matrices generated on different frequencies (see col. 8, lines 9-28).

As per claim 8: Wax teaches a method, forming the spatial signature by utilizing several channel estimate matrices calculated from different reception antennas (see fig. 4; 5, line 49-col. 6, line 18).

As per claim 9: Wax teaches a method, generating at least one covariance matrix of at least one channel and forming the spatial signature by means of at least one specific vector of the covariance matrix (see col. 8, lines 9-28). The different channel estimates are provided by Grubecck (abstract).

As per claim 10: Wax teaches a method, generating a singular value decomposition for a channel estimate matrix, by means of which specific value vectors of the covariance matrix are defined for the definition of the information related to the location (see col. 8, lines 9-28).

As per claim 11: Wax teaches a method, defining a first dominant delay path by utilizing specific values of the channel covariance matrix calculated for different delay paths or the channel singular values in such a manner that the dominant delay path is the path having the highest specific value energy (see col. 8, lines 9-28).

As per claim 12: Wax teaches a method, defining a first delay path whose specific value energy exceeds a predefined threshold value (see col. 8, lines 9-28).

As per claim 13: Grubeck teaches a method, utilizing additionally in the positioning at least one of the following measurements:

defining the direction of arrival as a DOA measurement (see at least, col. 1, line 55-col. 2, line 10; col. 6, lines 16-52). The required feature, the at least one measurement, is satisfied by the prior art's DOA measurement. Furthermore, the prior art's ('334) line of sight (LOS) selection, which is a function of direction), obviates the claimed feature of comparing the direction of reception and transmission signals with each other.

As per claim 14: Grubeck teaches a method, utilizing additionally in the positioning at least one of the following measurements:

measuring the time of arrival as a TOA measurement (see col. 6, lines 7-52),

measuring the time difference of arrival as a TDOA measurement (see col. 6, lines 7-52),

for the purpose of defining the distance between the transmitter and receiver (see col. 1, lines 48-55).

As per claim 15: Wax teaches a method, wherein the identifier signals are at least partly uncorrelated (see col. 4, lines 33-49). Polarized signals/channels are uncorrelated.

As per claim 17: Wax teaches a method, using the elements or parameters of the channel estimate corresponding to the shortest delay in the spatial signature of the signals (see col. 5, lines 5-23; col. 6, lines 48-52).

As per claim 19: Wax teaches a method, generating the identifier/code signals by coding the signals to be substantially non-interfering to each other (see col. 4, lines 21-49).

As per claim 23: Wax teaches a method, signaling the spatial signatures or the parameters of the spatial signatures of the received signals to a base station and defining the location of the terminal in the network part of the radio system (see col. 6, lines 24-36).

As per claim 24: Grubeck teaches a method, using one or more base stations in defining the location of the terminal (see col. 6, lines 16-30).

As per claim 25: Wax teaches a method, calculating the received power by means of the spatial signature of the signals and maximizing the received power in relation to the transmission direction for the purpose of defining the information related to the location between the transmitter and receiver (see col. 4, lines 21-65).

As per claim 29: Wax teaches a method, wherein the identifier signals are channel specific training sequences (see abstract; col. 6, lines 1-18).

As per claim 30: Kong teaches a method wherein the identifier signals are transmitted on a dedicated channel (see col. 11, line 66-col. 12, line 8).

As per claim 31: the features of claim 31 are similar to the features of claim 1, except claim 31 is directed to a system/means for performing the steps of method claim 1. Hence, the system/means is required by the method, claim 31 is rejected on the same ground and motivation as claim 1.

As per claim 32: the feature of claim 32 is similar to the feature of claim 2. Hence, claim 32 is rejected on the same ground and motivation as claim 2.

As per claim 34: the feature of claim 34 is similar to the feature of claim 3. Hence, claim 34 is rejected on the same ground and motivation as claim 3.

As per claim 35: the feature of claim 35 is similar to the feature of claim 5. Hence, claim 35 is rejected on the same ground and motivation as claim 5.

As per claim 36: the feature of claim 36 is similar to the feature of claim 6. Hence, claim 36 is rejected on the same ground and motivation as claim 6.

As per claim 37: the feature of claim 37 is similar to the feature of claim 7. Hence, claim 37 is rejected on the same ground and motivation as claim 7.

As per claim 38: the feature of claim 38 is similar to the feature of claim 8. Hence, claim 38 is rejected on the same ground and motivation as claim 8.

As per claim 39: the feature of claim 39 is similar to the feature of claim 9. Hence, claim 39 is rejected on the same ground and motivation as claim 9.

As per claim 40: the feature of claim 40 is similar to the feature of claim 10. Hence, claim 40 is rejected on the same ground and motivation as claim 10.

As per claim 41: the feature of claim 41 is similar to the feature of claim 11. Hence, claim 41 is rejected on the same ground and motivation as claim 11.

As per claim 42: the feature of claim 42 is similar to the feature of claim 12. Hence, claim 42 is rejected on the same ground and motivation as claim 12.

As per claim 43: the feature of claim 43 is similar to the feature of claim 13. Hence, claim 43 is rejected on the same g round and motivation as claim 13.

As per claim 44: the feature of claim 44 is similar to the feature of claim 14. Hence, claim 44 is rejected on the same ground and motivation as claim 14.

As per claim 45: the feature of claim 45 is similar to the feature of claim 15. Hence, claim 45 is rejected on the same ground and motivation as claim 15.

As per claim 49: the feature of claim 49 is similar to the feature of claim 29. Hence, claim 49 is rejected on the same ground and motivation as claim 29. Furthermore, a signature represents specific training sequence.

As per claim 51: the feature of claim 51 is similar to the feature of claim 17. Hence, claim 51 is rejected on the same ground and motivation as claim 17.

As per claim 53: the feature of claim 53 is similar to the feature of claim 19. Hence, claim 53 is rejected on the same ground and motivation as claim 19.

As per claim 57: Wax teaches a radio system, wherein the terminal is configured to signal the spatial signatures or the parameters of the spatial signatures of the received signals to the base station and to define the location of the terminal in the network part of the radio system (see col. 4, lines 21-65).

As per claim 58: the feature of claim 58 is similar to the feature of claim 24. Hence, claim 58 is rejected on the same ground and motivation as claim 24.

As per claim 59: the feature of claim 59 is similar to the feature of claim 25. Hence, claim 59 is rejected on the same ground and motivation as claim 59.

Caims 4, 20, 27, 28, 33, 47, 48 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references applied to claims 1 and 31 above, and further in view of Paulraj et al. (Paulraj) (US 6,351,499 B1).

As per claim 4: the above references do not explicitly teach about transmitting an identifier from at least two different antenna elements in order to transmit the identifier signals through at least two different channels, as claimed by applicant. However, in a related field of endeavor, paulraj teaches about a base station that transmits with M transmit antennas to a receive unit (mobile) with N receive antennas using different channels/paths (see figs 1 and 2; col. 3, lines 63-52; col. 4, lines 33-45) and wherein the transmitted signals include spatial signatures (identifiers) (see col. 10, lines 17-22). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to further modify the above references with the teaching of Paulraj

for the advantage of maximizing signal quality or throughput of a channel between a transmit and receive unit (see col. col. 3, lines 43-52).

As per claim 20: the feature of claim 20 is similar to the feature of claim 4. The prior art's (Paulraj) different path requires different channels. Therefore, claim 20 is rejected on the same ground and motivation as claim 4.

As per claim 27: Cedervall teaches a method, wherein the identifier signals are broadcast signals (see col.3, lines 37-67, particularly, lines 454-52). A signal from one source to many is a broadcast.

As per claim 28: Cedervall teaches a method, wherein the identifier signals are common pilot channel signals of a WCDMA radio system (see col. 2, lines 47-52; col. 2, lines 37-67; col. 7, lines 27-47).

As per claim 48: the feature of claim 48 is similar to the feature of claim 28. Hence, claim 48 is rejected on the same ground and motivation as claim 28.

As per claim 47: the feature of claim 47 is similar to the feature of claim 27. Hence, claim 47 is rejected on the same ground and motivation as claim 47.

As per claim 33: the feature of claim 33 is similar to the feature of claim 4. Hence, claim 33 is rejected on the same g round and motivation as claim 4.

As per claim 54: the feature of claim 54 is similar to the feature of claim 4. In that, the different paths provided in Paulraj require different channels/frequencies. Therefore, claim 54 is rejected on the same ground and motivation as claim 4.

Claims 21 and 26, 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references applied to claims 1 and 31 above, and further in view of Cedervall et al. (Cedervall) (US 6,011,974).

As per claim 21: the above references do not explicitly teach about a terminal serves as the receiver and perform its own position, as claimed by applicant. However, in a related field of endeavor, Cedervall teaches about a system and method for determining position of a cellular mobile terminal wherein the mobile terminal is provided with means to determine its own position (see col. 4, line 56-col. 5, line 23). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to further modify the above references for the advantage of providing an improved method and system for determining the position of a mobile radio terminal (see col. 1, lines 7-10).

As per claim 26: the feature of claim 26 is similar to the feature of claim 21. Hence, claim 26 is rejected on the same ground and motivation as claim 21.

As per claim 55: the feature of claim 55 is similar to the feature of claim 21. Hence, claim 55 is rejected on the same ground and motivation as claim 21.

Allowable Subject Matter

Claims 18 and 52 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Meless N. Zewdu whose telephone number is (571) 272-7873. The examiner can normally be reached on 8:30 am to 5:00 pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Banks-Harold, Marsha can be reached on (571) 272-7905. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Any inquiry of a general nature relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-2600.

Meless Zewdu Zewdu, Meless 6-16-06

Examiner

15 June 2006.